

*Water Spouts.*—Key West, 10th, 1.20 p. m., two water spouts were seen 7 miles WNW. from station, moving from E. to W.; one was complete, extending from a cumulo-stratus cloud to the water; the other was from the same cloud, but was only partially formed; it descended from the cloud but did not connect with the water; the phenomenon lasted for 25 minutes. Hatteras, N. C., 4th, 12 m., a large water spout was observed in the sound, about 3 miles north of station. When first observed, it was fully formed and extended from a heavy cumulo-stratus cloud, of black appearance, to the water, apparently a distance of half a mile. The spout was of a light grayish color near the water and of much darker color near the cloud; the water at its base seemed much agitated and was raised to a height of from 3 to 4 feet for several rods around. The water could be distinctly seen ascending the spout rapidly, with a spirally upward motion. The spout lasted for five minutes, when it broke; ten minutes elapsed before the column was fully drawn up and had disappeared within the cloud.

*High Tides.*—Indianola, 28th, 29th, 30th; Portsmouth, N. C., 3d, 13th; New Haven, 9th, 10th.

## TEMPERATURE OF WATER.

*The Temperature of Water*, as observed in rivers and harbors at Signal Service stations, with the average depth at which observations were taken, is given in the table on the left-hand side of chart No. III. Owing to loss of instrument, observations at Charleston are wanting on the 9th, and from the 24th to the 30th.

## ATMOSPHERIC ELECTRICITY.

*Thunder-storms.*—In the various districts they were reported as follows: New England, 1st to 7th, 11th, 13th, 22nd to 24th, 26th to 29th; Middle Atlantic states, 1st to 3rd, 5th, 9th to 12th, 22nd, 23rd, 25th to 29th; South Atlantic states, 3rd, 4th, 7th, 9th, 11th, 12th, 13th, 17th, 26th, 27th; Eastern Gulf states, 8th, 10th to 19th, 26th to 28th; Florida Peninsula, 1st to 7th, 10th to 16th, 19th, 21st, 22nd to 27th, 30th; Western Gulf states, 1st, 6th to 10th, 12th, 13th, 27th, 29th, 30th; Rio Grande valley, 1st, 6th, 7th, 8th, 10th, 11th, 13th, 27th, 29th, 30th; Ohio valley and Tennessee, 1st to 4th, 8th to 11th, 13th, 14th, 18th, 19th, 21st, 23rd to 28th, Lower Lake region, 1st to 5th, 9th, 10th, 12th, 22nd to 27th; Upper Lake region, 1st to 6th, 8th to 10th, 14th to 18th, 21st to 30th; Upper Mississippi valley, 1st to 12th, 14th, 15th, 21st to 30th; Missouri valley, 1st to 6th, 9th to 15th, 19th, 22nd to 30th; extreme Northwest, 3rd, 4th, 9th, 11th, 13th, 19th, 20th, 24th; Northern Slope, 1st to 4th, 18th, 19th, 21st to 23rd, 28th, 29th; Middle Slope, 1st, 5th, 6th, 9th, 18th, 22nd, 23rd, 25th, 26th to 29th; Southern Slope, 5th, 6th, 12th, 26th to 29th; Southern Plateau, 3rd, 4th, 10th to 13th, 28th; Middle Plateau, 23rd; Northern Plateau, 2nd, 4th, 8th, 13th, 17th, 24th; North Pacific coast region, 4th, 8th, 17th, 22nd, 23rd; Middle Pacific coast region, 1st, 2nd, 21st to 27th.

*Atmospheric Electricity Interfering with Telegraphic Communication.*—Dodge City, Kan., 29th; Ft. Elliott, Tex., 28th; Jacksboro, Tex., 7th, 27th and 29th; Eagle Pass, Tex., 8th and 29th; Brackettville, Tex., 30th; Bismarck, Dak., 19th.

*Zodiacal Light.*—Nashville, 5th, 6th, 11th, 12th, 16th, 17th, 19th to 25th and 30th; Wood's Holl, Mass., 15th and 16th; New Corydon, Ind., 21st, 22d, 24th, 26th, 27th and 30th; Monticello, Ia., 1st.

*Auroras.*—The most remarkable display for several years occurred on the 12th, 13th and 14th, and the line of observation was continuous from Sydney, N. S., westward to Umatilla, Or. Observers reported its appearance as far south as Louisville and northward to St. Vincent, Minn. At several stations in Dakota and Minnesota the display began on the 11th, and probably on this date the districts eastward to the Atlantic would have reported the same phenomenon had it not been for the heavy cloudiness which prevailed from the Lake region eastward to Newfoundland, accompanying the progress of low area No. II. It is interesting to note in connection with this great electrical disturbance that on precisely the same dates, but during the previous month of August a remarkable auroral display was observed very extensively in England and Scotland. An observer at the Stonyhurst Observatory describes it as recalling the magnificent displays of 1869, 1870 and 1872, while the play of the magnets was one of the most violent ever recorded at that observatory. On the 11th, 12th and 13th of August observers of the sun found indications of intense commotion; sunspots were numerous, large and active and protuberances shot up from the sun's surface, with increased force and velocity. The earth appeared to make instantaneous response to the solar storm and a magnetic disturbance suddenly commenced by an unusual exhibition of earth currents. At the Greenwich Observatory no such magnetic disturbance had been recorded for many years. This auroral display was not only very extensive but exceedingly brilliant, and many of its manifestations wonderfully strange; in the United States but two stations reported, viz: Duluth, 13th, 11 p. m.; St. Vincent, 12th, 10 p. m. Concerning the display for the present month (September) the following stations, with few exceptions, report the time of appearance and disappearance: Sydney, C. B. I., 14th. Halifax, N. S., 13th, 14th. Eastport, Me., 12th, from 8 to 11 p. m.; 13th, from 8 to 10 p. m.; 14th, from 7 to 9 p. m. Bangor, Me., 12th, from early dusk until midnight. Cornish Me., 14th. Dexter, Me., 12th, 7 to 9 p. m.; 14th, 8 to 10 p. m. Mt. Washington, N. H., 12th, 7 to 10.20 p. m.; 13th, 1.10 to 4 a. m., and from 7 to 8.40 p. m. Burlington, Vt., 12th, 7.15 to 9 p. m.; 14th, 8.30 to 10.30 p. m. Newport, Vt., 12th, 8 to 9 p. m.

Boston, 12th, 8 p. m. Newport, R. I., 12th, 7.30 to 8.30 p. m.; 13th, 1 a. m. to daybreak. New London, 12th, 9 to 9.45 p. m.; 13th, 2.10 to 2.38 a. m. New Haven, 12th, 7 to 9 p. m.; 13th, 1 to 3 a. m., also at 8 p. m. Cambridge, Mass., 12th, 8 to 8.45 p. m. Rowe, Mass., 12th, 8.30 to 9.30 p. m. Amherst, Mass., 12th, 9 p. m. Williamstown, Mass., 12th, 8 p. m.; 13th, 8 p. m.; 14th, 8.15 p. m. Albany, 12th, 8 p. m. to morning of the 13th. Oswego, 13th, 1 a. m. Waterburg, N. Y., 13th, 9 p. m.; 14th, 8 to 9 p. m. Ardenia, N. Y., 8 to 9 p. m. Rochester, 13th, 2 a. m. to daybreak. Buffalo, 13th, 1.30 a. m. Dyberry, Pa., 12th, 8.15 p. m. West Chester, Pa., 12th, 8 p. m. Fallsington, Pa., 12th, 8.15 to 9 p. m. Philadelphia, 12th, 8 p. m. Moorestown, N. J., 12th, 8.30 p. m. Freehold, N. J., 12th, 8 to 8.45 p. m. Atco, N. J., 12th, 8.30 p. m.; 13th, 9 p. m. Contoocookville, N. H., 12th, 8.30 to 9 p. m. Fallston, Md., 12th, 8 to 9 p. m. Woodstock, Md., 12th, 7.45 to 8.45 p. m. Fort McHenry, Md., 12th, 9 p. m. Accotink, Va., 12th, 8 p. m. Fort Myer, Va., 12th, 7.30 p. m. Washington, D. C., 12th, 7.40 to 9 p. m. Morgantown, 12th, 8 to 9.30 p. m. Erie, 13th, 12.50 to 2.40 a. m. Toronto, 12th, 13th. Cleveland, 12th, 8 p. m.; 13th, 2 to 4 a. m. Detroit, 12th, 7.20 to 11 p. m.; 13th, 12.20 a. m. to daybreak. Sandusky, 12th, 11.30 p. m. to 4 a. m. of 13th. Toledo, 12th, 7.50 p. m.; 13th, 3 to 4 a. m. North Lewisburg, Ohio, 12th, 8 p. m. Westerville, Ohio, 12th, 8 p. m. Wooster, Ohio, 12th, 8 p. m. Columbus, 13th, 12.10 to 1.35 a. m. Alpena, 12th, 8.30 p. m. to 4 a. m. of the 13th, and from 8.30 to 10.10 p. m.; 14th, 8.10 p. m. Port Huron, 12th, 11.30 p. m. to 5.30 a. m. of 13th. Escanaba, 12th, 8 p. m. to daybreak of the 13th, and from 10.25 to 11.30 p. m.; 14th, 8.40 to 10 p. m. Marquette, 12th, 7.35 p. m. to 5 a. m. of the 13th; 14th, 8.45 to 9.45 p. m. Chicago, 13th, 1.10 a. m. to daybreak. Grand Haven, 12th, 7.30 p. m. to 4.30 a. m. of the 13th. Fort Brady, Mich., 13th, 9 p. m.; 16th, 9 p. m. Northport, Mich., 12th, 9 p. m. to morning of 13th. Lansing, Mich., 12th, 9 p. m. Litchfield, 12th, 8.30 p. m. Duluth, 12th, 7.20 p. m. to 5.20 a. m. of the 13th. Indianapolis, 13th, 3 to 3.22 a. m. New Corydon, Ind., 12th, 7.30 p. m.; 13th, 2 to 4.45 a. m. Elmhurst, Ill., 12th, 8 to 9 p. m. Morrison, Ill., 12th, 9 p. m. Riley, Ill., 12th, 8 p. m. to 3.40 a. m. of the 13th. Champaign, Ill., 12th, 10.15 p. m. to 3.30 a. m. of 13th. Madison, Wis., 12th, 10.30 p. m. to 5 a. m. of 13th. Dubuque, 12th, 7.43 p. m. to 1.22 a. m. of the 13th. Burlington, Iowa, 13th, 1 to 1.35 a. m. LaCrosse, 12th, 8 p. m. to 4.30 a. m. of the 13th. Milwaukee, 13th, 12.05 to 4.30 a. m. St. Paul, 12th, 10 p. m. to 4.30 a. m. of the 13th. Clinton, Ia., 12th, from shortly after sunset to 3 a. m. of the 13th. Cresco, Ia., 12th, 8.15 to 10.20 p. m. Independence, Ia., 12th, 8 p. m. to morning of the 13th. Monticello, Ia., 12th, 8 p. m.; 14th, 11 p. m. Mission House, Wis., 12th, 8 to 9.30 p. m.; 14th, 8 to 9.30 p. m. Embarrass, Wis., 13th, 2 a. m.; 14th, 8.30 p. m. Manitowoc, Wis., 12th; 14th. Beloit, Wis., 12th, 8 p. m. to midnight. Northfield, Minn., 12th, 8 p. m. to 4 a. m. of the 13th. St. Vincent, Minn., 11th, during the evening; 12th, 6.30 to 10 p. m.; 14th, from dusk to 10 p. m. Bismarck, 11th, 8 p. m.; 12th, 7 p. m. to 3 a. m. of the 13th; 14th, 8 p. m. Moorehead, Minn., 12th, 8 to 9.50 p. m. Fort Stevenson, Dak., 11th; 12th; 13th; 14th; Fort Meade, Dak., 12th, 1 to 2 a. m. Fort Snelling, Minn., 12th, 8 to 10 p. m. Huron, Dak., 12th, 9 p. m.; 13th, 2 to 4 a. m.; 14th, 9 p. m. to 3 a. m. of the 15th and from 8 p. m. to midnight. Yankton, 12th, 10 p. m. to 5 a. m. of 13th. Davenport, 11.55 p. m. to 2.30 a. m. of 13th. Fort Bennett, Dak., 12th, 10 p. m. to midnight; 14th, 9.30 to 10.10 p. m. Ft. Sully, Dak., 13th, 9 p. m., to morning of 14th. North Platte, 12th, 11 p. m. to 1 a. m. of the 13th; 14th, 8 to 11.30 p. m. Clay Center, Kan., 14th, 10 p. m., a bow of light, due north, of a pinkish cast and the form of a rain-bow; no beams were seen. Fort Keogh, Mont., 12th, 10.15 p. m. Fort Benton, Mont., 12th, 10 p. m. Fort Shaw, Mont., 12th, 10.30 p. m. Colfax, Washington Ty., 14th, 8.30 to 10 p. m. Spangle, Washington Ty., 14th. Fort Lapwai, Idaho, 14th, 7.55 to 9.10 p. m. Mission, Idaho, 14th, 8.15 p. m. Dayton, Washington Ty., 14th, 7.30 to 9.30 p. m. Umatilla, Or., 14th, 8 to 9.10 p. m. The following stations reported the display as materially affecting telegraphic communication: Fort Shaw, Mont., 12th. La Crosse, 13th, great difficulty was experienced in working the telegraph lines; several operators were of the opinion that the instruments could have been worked without the assistance of battery. Buffalo, 13th, telegraphic communication much disturbed. Cleveland, 12th, wires strongly affected. Albany, 12th, telegraph companies were unable to use any of the quadruplexes and with difficulty the ordinary relay; interruption to business very serious between east and west, and continued until 10.30 a. m. of the 13th. New Haven, 13th, telegraphic communication seriously interrupted. Boston, 12th, telegraph wires rendered useless during the display. The display of the 23rd ranks next in importance to that of the 12th to 14th. Its appearance was not by any means as general, but its observance in an extreme southerly latitude makes it exceptional. Ithaca, N. Y., 10 to 11.30 p. m. Rochester, 10 p. m. Woodstock, Md., 9 to 10.15 p. m. Westerville, Ohio, 8 p. m. Augusta, Ga., 7 p. m., faint rose color, lasted 20 minutes; no arch. Riley, Ill., 8.30 to 11 p. m. Springfield, Ill., 8.20 p. m. Keokuk, 8.20 to 8.52 p. m. Dubuque, 8.20 p. m. Next in point of magnitude to that of the 23rd, was the display of the 20th, the following stations reporting: Sydney, N. S.; Halifax, from 8 to 9 p. m.; Eastport, 9.30 p. m.; Gardiner, Me., 11 p. m.; Cornish, Me., 9 p. m.; Burlington, Vt., 11 to 11.55 p. m.; Boston, 11 to 11.45 p. m.; Alpena, 10 to 11.30 p. m. The display of the 28th was quite generally observed in New England and the Upper Lake region, the following stations reporting: Gardiner, Me., 11.30 p. m.; Mt. Washington, 10 to 11.45 p. m.; Burlington, Vt., 11 to 11.15 p. m.; Alpena, 8.25 p. m. to 1.45 a. m. of the 29th. Escanaba, 10 to 11.45 p. m.

Marquette, 10 to 11.45 p. m. The following were local displays of more or less brilliancy: Eastport, 29th, 8 p. m. to midnight; 16th, 9.30 p. m. Burlington, Vt., 16th, 7 to 11.30 p. m.; 25th, 11 p. m. to 1.30 a. m. of 26th. Boston, 30th, 11 p. m. Ithaca, N. Y., 30th, 9.30 p. m. Morgantown, 15th, 1 a. m. Bellefontaine, Ohio, 10th, 7.25 p. m. to 4 a. m. of the 11th. Alpena, 15th, 8.35 p. m. to 2 a. m. of the 26th. Fort Brady, Mich., 25th, 9 p. m. Northport, Mich., 25th, 10.20 p. m. until midnight. St. Vincent, Minn., 21st, from dusk to 9.40 p. m.; 24th, 9 p. m. Yankton, 15th, 8.30 to 9 p. m. Clear Creek, Nebr., 17th and 18th.

## OPTICAL PHENOMENA.

*Mirage*—Swanwick, Ill., 12th, visible nearly one hour. Northport, Mich., 1st, showing Torch Lake and its surroundings, situated in Antrim county, 14 miles to the eastward; the shore of Lake Michigan, two miles to the west and Beaver Islands and the highlands of Emmet county were distinctly visible. Umatilla, Or., 11th, the river, at a point about half mile below station, appeared elevated about 10 feet, apparently forming a water-fall. Indianola, 2nd, 15th, 16th, 19th and 23d. Manasquan, N. J., 6th, 1.50 p. m., ships were seen distinctly reflected upon the clouds along the New Jersey coast.

*Lunar halos* have been observed in the various districts on the following dates: New England, 7th; Middle Atlantic states, 2nd to 5th, 8th, 9th; South Atlantic states, 4th, 8th to 14th; Florida Peninsula, 1st, 4th, 5th, 8th, 11th; Eastern Gulf states, 10th, 13th; Western Gulf states, 2nd to 7th, 10th; Rio Grande valley, 7th; Ohio valley and Tennessee, 1st, 2nd, 3rd, 5th, 7th, 9th, 10th, 12th, 13th, 14th; Lower Lake region, 6th, 8th, 15th; Upper Lake region, 5th, 6th, 10th, 13th, 14th, 29th; Upper Mississippi valley, 2nd, 5th, 7th, 8th, 29th; Missouri valley, 1st, 30th; Northern Slope, 2nd, 3rd, 10th; Middle Slope, 30th; Northern Plateau, 7th; Southern Plateau, 28th.

*Solar halos* have been observed in the various districts on the following dates: New England, 19th; South Atlantic states, 9th, 19th; Ohio valley and Tennessee, 2nd, 3rd, 7th, 8th, 13th, 14th, 21st, 22nd; Lower Lake region, 1st, 4th, 6th, 14th, 22nd, 29th, 30th; Upper Lake region, 21st, 29th; extreme Northwest, 21st, 22nd; Upper Mississippi valley, 1st, 2nd, 8th, 13th, 14th, 21st, 22nd, 29th; Missouri valley, 16th; Middle Slope, 1st, 12th, 13th, 16th; Northern Slope, 17th; Northern Plateau, 3rd, 7th, 21st, 26th; Middle Plateau, 17th, 27th; North Pacific region, 1st, 3rd, 7th, 16th, 28th; Middle Pacific region, 27th, 28th.

## MISCELLANEOUS PHENOMENA.

*Prairie and Forest Fires.*—*California*: San Francisco, 14th, 3 p. m., considerable smoke was observed in the northwest, and at 5.30 p. m., the greater part of the sky was obscured, followed by occasional showers of ashes; at sunset the sky had a livid appearance, which caused much alarm until telegraphic reports gave information of heavy forest fires in Marin county. San Diego, 8th, 9th, 10th, 11th and 12th, brush fires in mountains. *Canada*: Great fires raging in the vicinity of Kingston, Ottawa, Gravelhurst, Odessa and Bellville, Ontario, on the 3d. At Kingston, smoke very dense and business on the river almost at a standstill, boats being afraid to move. Gravelhurst, several farm-houses and large barns with their contents burned. North of Bracebridge fires exceedingly destructive; several persons burned to death. Heavy brush fires between Earnstown and Collins Bay, on the line of the Grand Trunk Railroad; a large quantity of hay and stacks burned, also a number of barns and dwellings. The whole section is dark with smoke, the sun being shut out from view by a density of this element never before experienced; loss in this vicinity estimated at \$80,000. Modoc Township, large amount of property destroyed, including dwellings, barns, crops, implements, fences, etc. The villages of Roslin and Sterling were burned up to on every side. Gravelhurst, Ontario, 16th, the Woodstock Lumber Company's mills and 3,000,000 feet of lumber burned; west end of the town on fire, one church and six houses destroyed. Buffalo, 16th, thirty-five miles south of city fires very extensive, destroying dwellings and barns; telegraphic communication interrupted; burning trees across the track seriously impeded travel. *Dakota*: Yankton, 19th and 20th. *Indian Territory*: Ft. Gibson, 7th, 14th, 20th, 22nd, 23rd, 24th. *Texas*: Grierson Springs, 2nd to 5th; Bracketville, 5th. *Kansas*: Council Grove, 17th, extensive fires west of station, 700 tons of hay burned. *Michigan*: Port Huron, 6th, extensive fires along the lake shore and in the interior of Huron and Sanilac counties; entire county from Forestville to Port Austin in flames and the inhabitants fleeing for their lives. The small town of Port Hope entirely destroyed and many people burned to death; throughout this section the loss of farm and town property is immense. It is reported that the forests, covering miles in width, were one vast sheet of flame which traveled rapidly southward, destroying everything in its path; fires more disastrous than the great conflagration of 1871; 7th, the towns of Vassar and Minden have suffered severely but more particularly the surrounding country. Sanilac Co., 10th, 215 families have been burned out in the towns of Marlette, Flynn, Argyle, Evergreen, Moore, Lalotte and Elmer, and 92 persons burned to death. In general, the forest fires of Michigan swept over that portion of the State lying between Saginaw Bay to the north and Lake St. Clair on the south, stretching along the coast of Lake Huron for about 100 miles, and extending inland over a breadth of from 20 to 60 miles. From 500 to 1,000